

CE

mase GENERATORS

I
GB
D
E
F
FIN

MULTIWORK MW 170 HB-RE 230V 3~



MANUALE DI USO E MANUTENZIONE
USE AND MAINTENANCE MANUAL
GEBRAUCHSANWEISUNG UND WARTUNGSVORSCHRIFTEN
MANUAL USO Y MANTENIMIENTO
MANUEL D'INSTRUCTION ET D'ENTRETIEN
KÄYTTÖ-JAHUOLTO-OPAS

NR.000000



MASE GENERATORS S.p.A.

Tel.0547/354311

Fax 0547/31755

DICHIARAZIONE CE DI CONFORMITA'
EC DECLARATION OF CONFORMITY

Fabbricante/Manufacturer: MASE GENERATORS S.p.A.

Indirizzo /Address : Via Tortona 345, Pievesestina (FC)

Il sottoscritto Luigi Foresti in qualità di direttore tecnico della MASE GENERATORS S.p.A., dichiara sotto la propria responsabilità che il gruppo elettrogeno modello :

The undersigned Luigi Foresti as MASE GENERATORS S.p.A. technical manager declares, under his sole responsibility, that the generator model.....:

Codice / Code

Descrizione / Model

No. matricola / Serial No.

E' conforme alle disposizioni delle Direttive di seguito elencate :

CEE 89/392 (come emendata delle Direttive CEE 91/368 e CEE 93/44)

CEE 89/336 (come emendata delle Direttive CEE 92/31)

CEE 73/23 modificata da CEE 93/68.

Corresponds to the requirements of the following EEC Directives :

89/392/EEC (as amended by the Directive 91/368/EEC and 93/44/EEC)

89/336/EEC (as amended by the Directive 92/31/EEC)

73/23/EEC as amended by 93/68/EEC.

Cesena, / /

.....

Direttore Tecnico
Technical Director

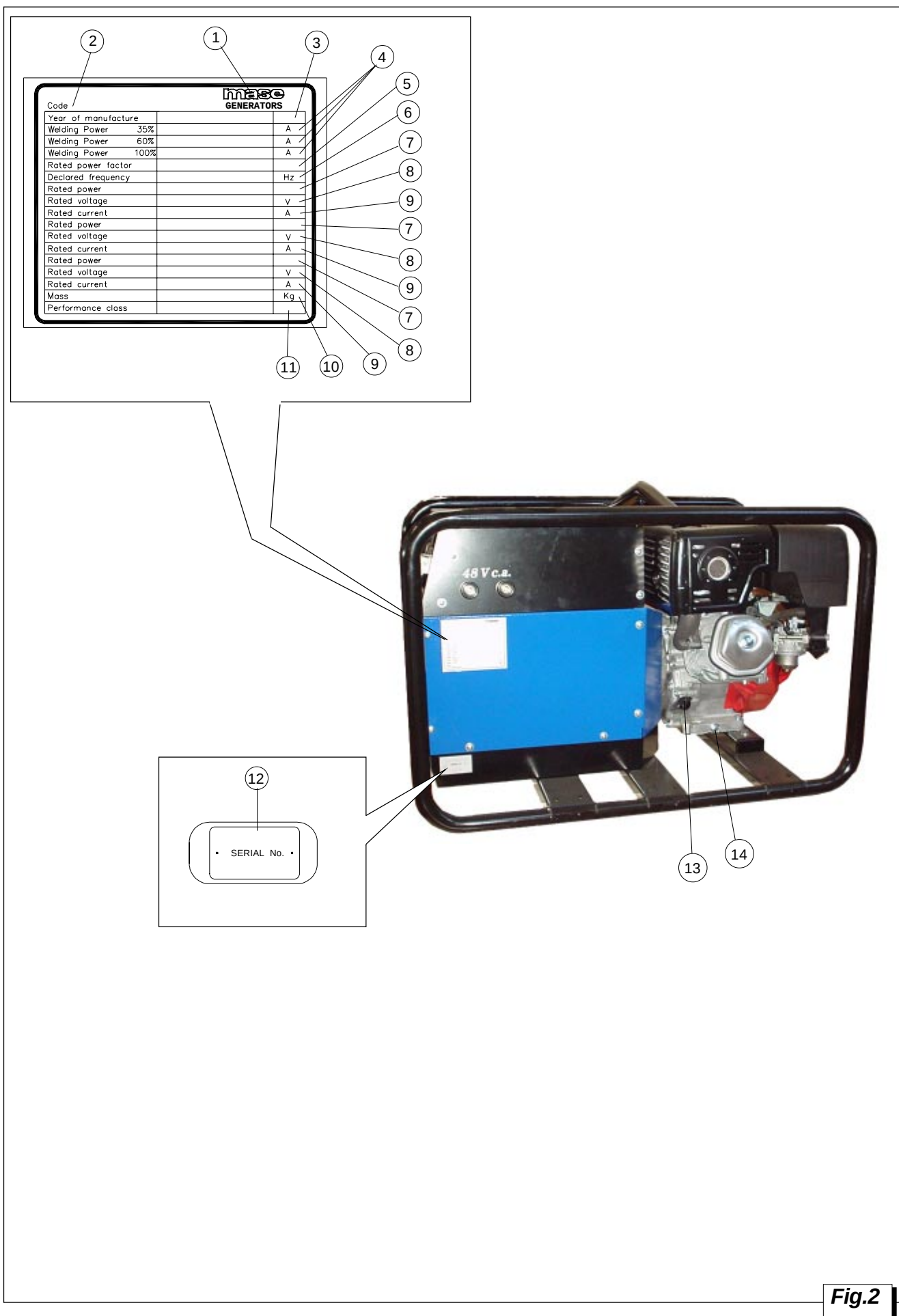


Fig.2

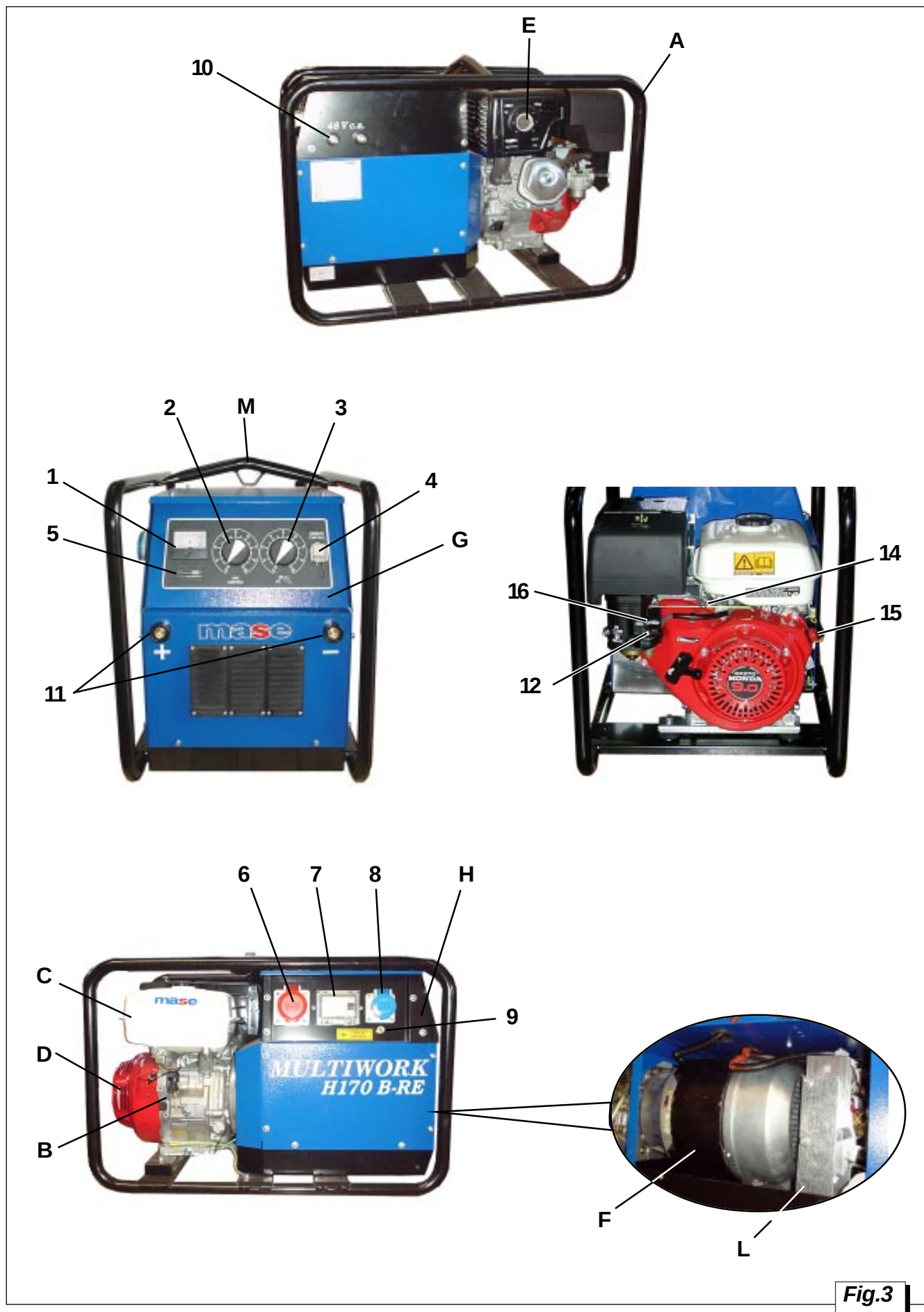


Fig.3

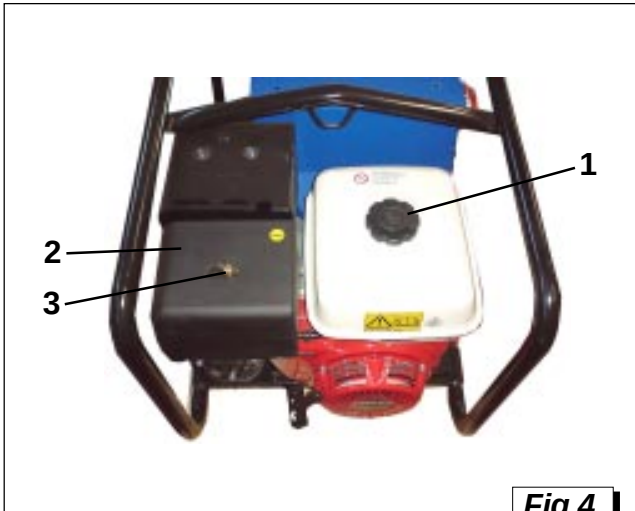


Fig.4

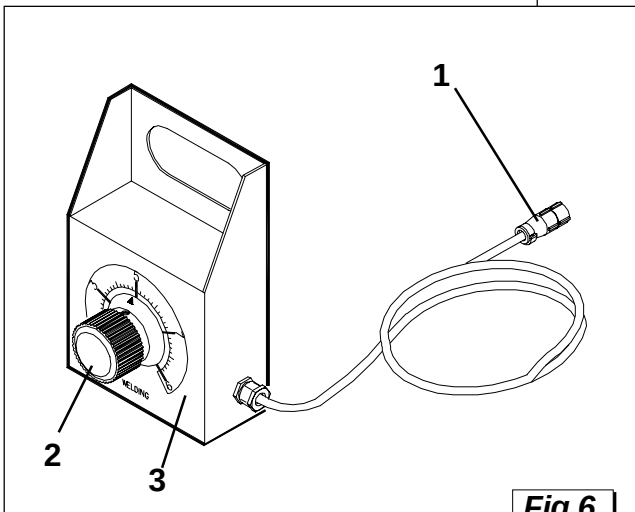


Fig.6

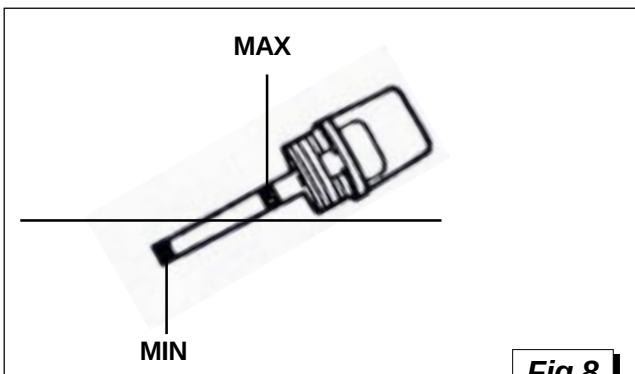


Fig.8

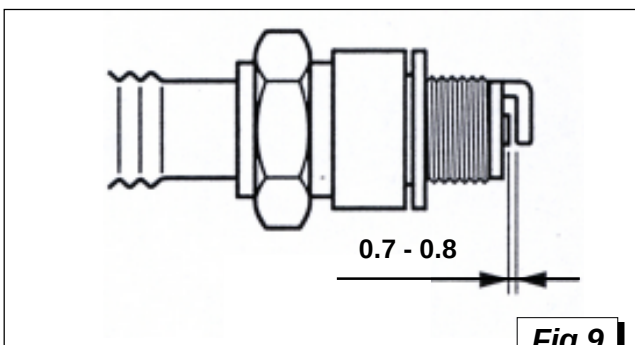


Fig.9

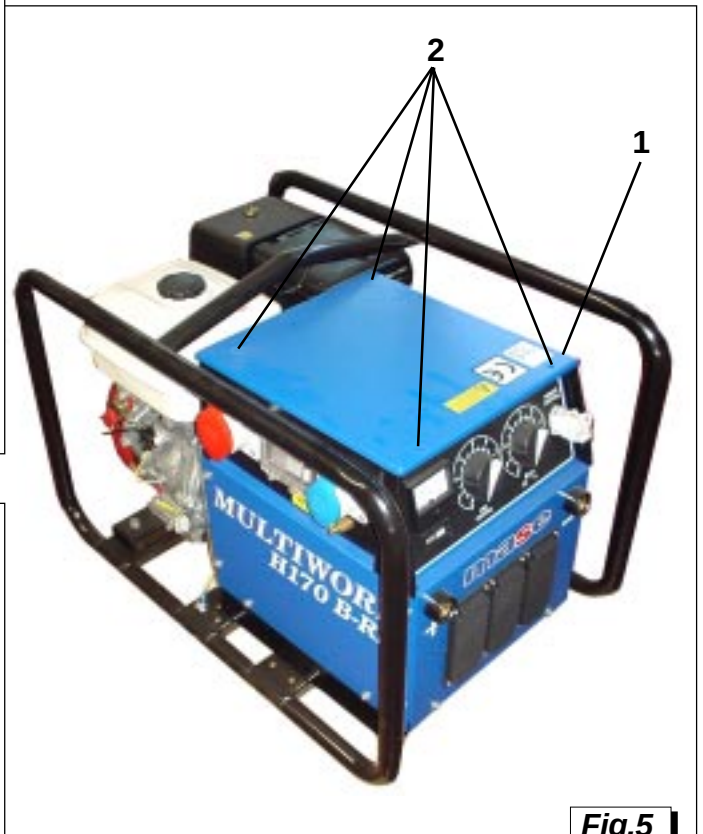


Fig.5

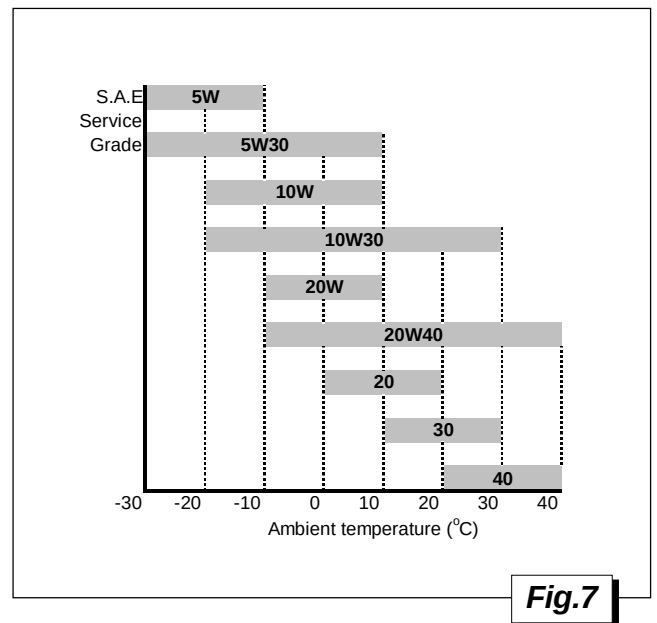


Fig.7

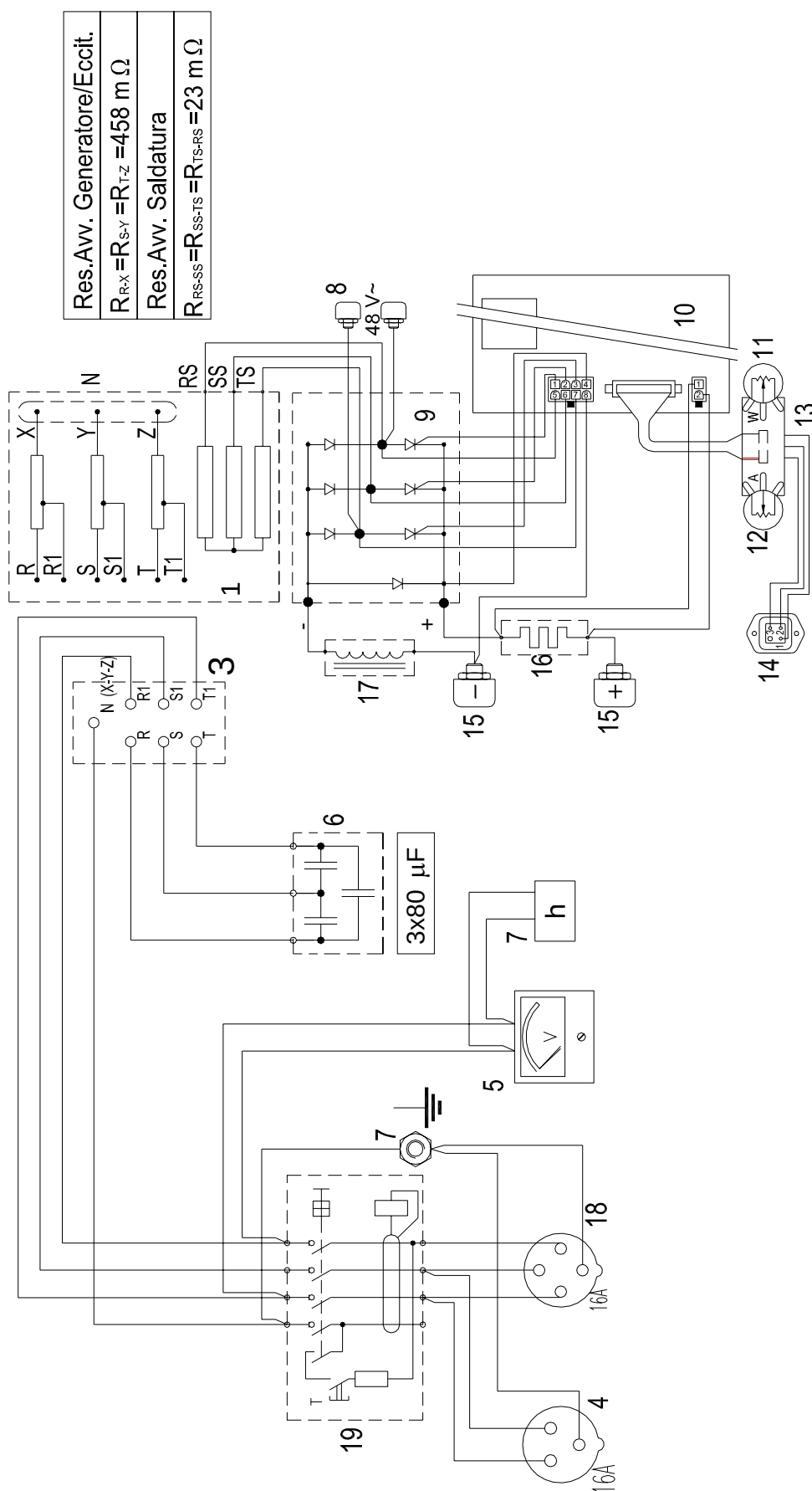


Fig.10

INDEX

1	GENERAL INFORMATION	18
1.1	Purpose and field of application of the manual	18
1.2	Symbols	18
1.3	Reference documents	19
1.4	Facsimile of CE declaration of conformity	19
1.5	Reference regulations and legislative provisions	19
1.6	Marking	19
1.7	Machine identification	19
1.8	Configurations	19
1.9	Composition of the motor welding sets	20
1.10	Instrument panel	20
2	TECHNICAL CHARACTERISTICS	20
2.1	General characteristics	20
2.2	Welding graph	20
2.3	Tables of technical characteristics	20
3	SAFETY REGULATIONS	21
3.1	General precautions	21
3.2	Prescriptions for safety during installation and setup	21
3.3	Connecting the motor welding set to earth	21
4	USING THE MOTOR WELDING SET	22
4.1	Positioning	22
4.2	Preliminary checks	22
4.3	Refuelling	22
4.4	Starting the engine	22
4.5	Use as AC generator	23
4.6	Use as welder	23
4.7	Using the remote control (optional)	23
4.8	Stopping	23
5	PROTECTIONS AND WARNING SIGNALS	24
6	MAINTENANCE	24
6.1	Preamble	24
6.2	Ordinary engine maintenance	24
6.3	Engine oil change	24
6.4	Spark plug maintenance	24
6.5	Air filter cartridge cleaning/replacement	24
6.6	Scheduled maintenance table	25
6.7	Troubleshooting	25
7	TRANSPORT AND HANDLING	26
8	STORAGE	26
9	SCRAPPING	26
10	WIRING DIAGRAM	26

1 GENERAL INFORMATION



Carefully consult this manual before proceeding with any operation on the generator.

FAILURE TO RESPECT THE SPECIFICATIONS CONTAINED IN THIS USE AND MAINTENANCE
MANUAL WILL RESULT IN FORFEITURE OF THE GUARANTEE ON THE PRODUCT

1.1 Purpose and field of application of the manual

Thank you for choosing a **MASE** product.

This manual has been drawn up by the manufacturer with the purpose of providing essential information and instructions for proper use and maintenance in conditions of safety and constitutes an integral part of the generator equipment. The manual must be kept safely, protected from any agent which might damage it, for the entire life of the generator and must accompany the generator if transferred to another user or owner.

The information contained in the manual is addressed to all those persons involved in the operating life cycle of the generator, and is necessary to inform both those who effectively carry out the different operations and those who coordinate the activities, arrange the necessary logistics and regulate access to the place where the generator will be installed and operated.

The manual defines the purpose for which the generator was constructed and contains all the information necessary to guarantee safe and proper use.

Constant observance of the instructions contained in this manual guarantees the safety of the operator, operating economy and a longer life of the generator.

It is warmly recommended to carefully read the contents of this manual and the reference documents; only thus can regular functioning and reliability of the generator be guaranteed over time, and protection against damage to persons or things.

The drawings are provided by way of example. Even if the generator in your possession differs considerably from the illustrations contained in this manual, the safety of the generator and the information provided are nevertheless guaranteed.

To facilitate consultation, it has been divided into sections identifying the main concepts; for a quick look at the topics, consult the index.

Note: the information contained in this publication is correct at the time of printing. The manufacturer in his pursuit of a policy of constant development and upgrading of the product reserves the right to make modifications without prior notice.

1.2 Symbols

Those parts of the text not to be ignored are highlighted in bold type preceded by a symbol, as illustrated and defined below.

**DANGER**

Indicates that particular attention must be paid in order to prevent running into serious danger which could lead to death or possible hazards to the health of personnel.

**WARNING**

A condition which may occur during the lifetime of a product, system or plant considered at risk regarding damage to persons, property, the environment or economic loss.

**CAUTION**

Indicates that particular attention must be paid in order to prevent serious consequences which could result in damage to tangible goods, such as the resources or the product.

**INFORMATION**

Instructions of particular importance.

1.3 Reference documents

The instructions for use provided with each motor welding set are made up of a collection of documents of which this manual represents the General Part. Normally, the following documents are provided:

- a - CE declaration of conformity.
- b - Instruction manual for use of the motor welding set (this manual)
- c - Wiring diagrams of the control panels and power board.
- d - Engine use and maintenance manual
- e - Warranty card
- f - List of Mase Service Centres

1.4 Facsimile of CE declaration of conformity

The generators constructed by MASE, intended for countries in the European Community, are in conformity with the applicable EEC Directives (see 1.5) and are furnished with an EC declaration of conformity (Fig. 1).

1.5 Reference regulations and legislative provisions

All the MASE diesel generators are designed and manufactured in compliance with the legislation in force. The generator and its components are constructed in accordance with the following applicable regulations and directives:

EN 292-1/2: Machine safety regulations.
General design principles.

EN 294: Machine safety regulations.
Safety distances to prevent contact of dangerous parts with the upper limbs.

ISO 3046: Alternate internal-combustion engines.

IEC 34-1: Rotary electric machines.

ISO 8528-1: Alternate current generators driven by alternate internal-combustion engines.

EN 60204-1 (CEI 44-5):

- Machine safety.
- Electrical equipment of machines.

EN 60439-1 (CEI 17-13/1): Assembled protection and manoeuvring equipment for low voltage (low-voltage panels).

EN 50081-1/2 (Electromagnetic compatibility): General regulation on emission

- Part 1: Residential, commercial and light-industry environments.
- Part 2: Industrial environment.

EN 50082-1/2 (Electromagnetic compatibility): General regulation on immunity.

- Part 1: Residential, commercial and light-industry environments.
- Part 2: Industrial environment.

89/392/EEC and subsequent amendments contained in the Directives **91/368/EEC**, **93/44/EEC** and **93/68/EEC**: Essential machine requirements for safety and health protection ("Machine" directive).

73/23/EEC and subsequent amendments contained in the Directive **93/68/EEC**: Guarantee of safety of electrical material intended for use within certain voltage limits ("Low Voltage" directives).

1.6 Marking

The generator identification plate carries all the identification data in conformity with ISO 8528 and in accordance with the provisions for CE marking for those cases where required. Below is a facsimile of the identification plate fixed on the control panel of each generator (Fig.2)

1.7 Machine identification

See Fig.2

- 1 – Manufacturer
- 2 – Machine code
- 3 – Year of construction
- 4 – Power during welding
- 5 – Power factor
- 6 – Declared frequency
- 7 – Continuous power
- 8 – Nominal tension
- 9 – Nominal current
- 10 – Weight
- 11 – Performance rating
- 12 – Serial number

The machine code number, the serial number and the year of construction must always be quoted when contacting the manufacturer for information, requests for spare parts, etc.

1.8 Configurations

One of the characteristics of the Multiwork series is that it can be supplied in different configurations:

- without trailer (Fig.2)
- on trailer with handles

1.9 Composition of the motor welding sets

See Fig.2

The motor welding sets are essentially made up of the following components:

- A - Frame
- B - Engine
- C - Fuel tank
- D - Recoil assy
- E - Muffler
- F - Alternator
- G - Control panel
- H - Taps panel
- H - Inductor
- L - Diode bridge
- M - Lift up

1.10 Instrument panel

Each motor welding set is fitted with an instrument panel for the controls with the following components:

See Fig.3

- 1 - Voltmeter
- 2 - Welding current regulation
- 3 - Welding arc regulation
- 4 - Remote control connector
- 5 - Hour counter
- 6 - Three-phase outlet, EEC 16A 230V 3P+GND
- 7 - Differential switch 4P
- 8 - Single-phase outlet, EEC 16A 230V 2P+GND
- 9 - Earth connection terminal
- 10 - 48V Outlet (AC)
- 11 - Welding couplings (+/-)

2 TECHNICAL CHARACTERISTICS

2.1 General characteristics

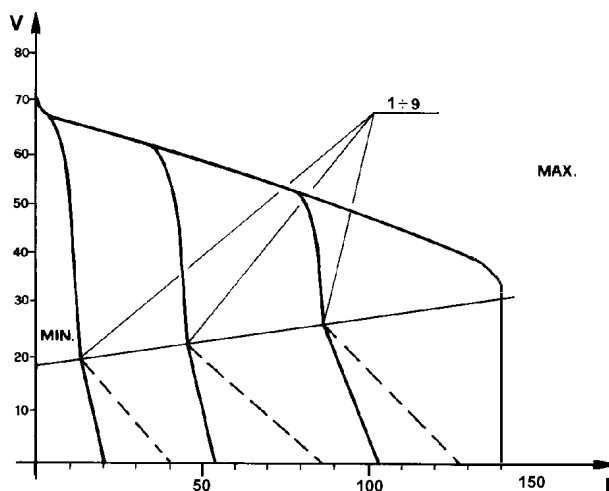
The motor welding sets of the Multiwork **MW70 HB-RE** series (HONDA powered) are designed for use in the industrial field in the welding sector.

The 4-stroke gasoline engine with air cooling designed for heavy duty is extremely reliable and robust.

Particular attention has been paid to the degree of protection against external agents, engine protection and protection of the electrical parts against overload or overheating.

The alternator is the 2-pole asynchronous type with excitation capacitors and is fitted with electronic control of the welding current. It is able to deliver direct current for welding, and 230V three-phase, 230V single-phase and 48V single-phase alternate current.

2.2 Welding graph



2.3 Tables of technical characteristics

GENERAL CHARACTERISTICS	
DIMENSIONS (L x W x H)	800x530x520 mm
DRY WEIGHT (WITHOUT BATTERY)	98 Kg
CAPACITA' SERBATOIO CARBURANTE	6,5 Liters
MAX. INCLINATION	25°

ALTERNATOR	
TYPE	ASYNCHRONOUS, THREE-PHASE, SELF-EXCITED AND SELF-REGULATING
INSULATION CLASS	F

WELDER	
CONTROL	ELECTRONIC
CURRENT AND SERVICE FACTORS	145 at 35% - 135 at 60%
FLASHOVER VOLTAGE	68 V
ELECTRODE DIAMETER	4 mm MAX

GENERATOR	
THREE-PHASE POWER (230V)	4.600 VA
SINGLE-PHASE POWER (230V)	3.000 VA
48 V POWER	2.000 VA
FREQUENCY	50 Hz
VOLTAGE STABILITY	10%
FREQUENCY STABILITY	3%
POWER FACTOR	0,8

ENGINE	
TYPE	HONDA
MODEL	GX 270
COOLING	AIR
NUMBER OF CYLINDERS	1
DISPLACEMENT	270 cm3
POWER SUPPLY	GREEN GASOLINE
POWER	6 KW / 8,2 HP
SUCTION	NATURAL
ENGINE RPM	3000 rpm
OIL SUMP CAPACITY	1.1 Litres
FUEL CONSUMPTION	230 g/HP/h
STARTING	MANUAL

3 SAFETY REGULATIONS

3.1 General precautions

Before starting the motor welding set and before starting any lubrication or maintenance operation, it is indispensable for the staff responsible to read and understand all the WARNINGS and all the CAUTION and DANGER indications listed in this manual and in the supplementary documentation furnished.

Nevertheless, the manufacturer cannot foresee all the possible circumstances which may lead to potential risks in the effective conditions of use of the generator.

Any operations and/or procedures for maintenance not expressly recommended or indicated in the user manuals must always be notified to and approved by the Manufacturer.

In the event that a procedure not specifically recommended needs to be applied, the user is responsible for assuring that such procedure is safe and does not cause harm to persons or things.

The manufacturer declines all responsibility for damage to persons or things deriving from inobservance of the safety regulations.

Carefully examine the safety warning plates on the machine and respect the relevant instructions.

- Do not permit incompetent persons or without adequate training to use the motor welding set.
- Do not permit children or animals to approach the motor welding set when it is in operation.
- Do not access the motor welding set with wet hands, since it is a potential source of electric shock if improperly used.
- Any inspections of the motor welding set must be carried out with the engine off. Inspections with the engine on are to be carried out by specialised personnel only.
- Exhaust gas contains carbon monoxide and other noxious residues. Never operate the generator in inadequately ventilated places.
- Do not operate the motor welding set near places with a danger of explosion or fire.
- Refuelling must be carried out exclusively with the engine off.
- The motor welding set must be connected to earth using a copper wire of suitable cross-section (see section 3.3).

DANGER

- *Do not allow access to persons wearing a pace-maker because of possible electromagnetic interference with the device.*
- *In the event of fire, use a homologated fire extinguisher and never use water.*

WARNING

When using the motor welding set, bear in mind that in wet or very humid places and in confined conduction spaces it is obligatory to comply with Articles 313 and 318 of Presidential Decree No. 547 27/04/55, as well as CHAP. 11 SECT. IV of the CEI 64-8 regulation.

3.2 Prescriptions for safety during installation and setup

DANGER

- *The personnel in charge of installation and starting of the motor welding set must always wear a protective helmet; wear safety shoes and overalls.*
- *Immediately change wet overalls.*
- *Use protective gloves.*
- *Do not leave disassembled parts, tools or anything else not forming part of the system on or near the engine.*
- *Never leave inflammable liquids or cloths soaked in inflammable liquids in proximity of the motor welding set, near electric equipment (including lamps) or parts of the electrical system.*
- *Take the necessary precautions to prevent the danger of electrocution.*
- *Check that the earthing system has been installed and constructed in accordance with regulations.*

3.3 Connecting the motor welding set to earth

For the safety of the users, the earth connection of the motor welding set must always be carried out paying particular attention to the cable cross-section used, which must be at least 10 mm².

For the connection of the earth cable use the dedicated terminal on the control panel (Fig. 3 Ref. 9).

The manufacturer is not responsible for any damage caused by failure to earth the system.

4 USING THE MOTOR WELDING SET

4.1 Positioning

The motor welding sets of the Multiwork **MW170 HB-RE** series must be positioned as horizontally as possible, i.e. placed on a flat surface or made to sit horizontally by placing shims under the frame.



WARNING

If necessary with the versions with trailer, use some chocks on both wheels.



CAUTION

The engine functions properly if it does not exceed a maximum inclination of 25°, both on the longitudinal and the transversal axis. Should the engine be operated in conditions at a greater inclination, there is a risk of insufficient lubrication or suction of engine oil from the air filter.

4.2 Preliminary checks

Before beginning with any starting procedure, it is extremely important to become "familiar" with the motor welding set and its controls. Furthermore, a visual inspection must be carried out on the machine and the installation.

Any source of potential or real danger must be eliminated before proceeding.

- Identify the position of the Ignition / stopping key, switches and other emergency systems on the motor welding set.
- Learn the special emergency procedures relative to the installation in question.
- Identify the position of the fire extinguisher or other protection and emergency devices and learn their functioning.
- Identify any sources of danger such as fuel, engine oil or acid solution leaks, condensate in the drip caps, high voltage, high pressure.
- Ensure that the motor welding set is clean and that the surrounding areas are clean and free of obstacles.
- Check that there are no obstructions in the inlets and ventilation ducts.
- Check that the exhaust pipe is not oriented against obstacles, or make sure that these are at least two metres away.
- Check that the earth connection has been carried out properly.

At first starting of the motor welding set, after having done any type of maintenance work, it is always good practice to check:

- the oil level by means of the dipstick (Fig.2 Ref.13);
- that all the electrical utilities are off so that the genera-

tor is not started on load;

- that the fuel pipes are undamaged and properly connected;
- that there are no electrical connections in a bad state.

4.3 Refuelling

Refuelling must be carried out with extreme care, ensuring that fuel does not overflow from the engine tank and respecting the maximum level.

When refuelling has been completed, carefully close the filler cap (Fig.4 Ref.1)



DANGER

- *Fuel is toxic and inflammable and must therefore be kept in special airtight containers and stored in inaccessible places.*
- *Refuelling must always be carried out with the engine off.*
- *Do not smoke and do not use open flames during refuelling.*
- *Refuel in well-ventilated places.*
- *Avoid contact of fuel with the skin and do not inhale the fumes. Vaseline.*

4.4 Starting

Before starting the generator check that all the utilities are off to prevent putting the still cold engine under stress.



WARNING

The generator engine has been calibrated, in idle, to 3240 rpm equal to 54 Hz, as the engine stabilises at about 3000 rpm equal to 50Hz with a load. For this reason, the accelerator lever, (Fig. 3, ref. 14), must never shift for any reason, since the output voltage, frequency and power values of the generator would be compromised.

To start proceed as follows.

- Disconnect the outlets, (alternatively the magnetothermal differential switch), to prevent putting the still cold engine under stress.
- Turn the engine stop switch to position "I", (Fig. 3, ref. 15).
- Open the fuel cock by turning the lever shown in Fig. 3, ref. 12.
- If the engine is cold, close the air start lever by turning it as shown in Fig. 3, ref. 16, before attempting to start. *If the engine is hot the start lever need not be turned.*
- Proceed by firmly pulling the self-winding cord, (Fig. 3, ref. D), to start engine rotation.
- Repeat the operation if the engine has not started at the first attempt.
- As soon as the engine has started, gradually return the air start lever to the original position.

**CAUTION**

To prevent damage to the self-winding cord of the engine, never release it abruptly after having pulled it out fully, but guide it until complete rewinding.

4.5 Use as AC generator

Before powering any utility, leave the engine to run without applied load for at least five minutes so that it gradually reaches the operating temperature. This will guarantee longer life of the engine and eliminate the risk of seizures.

Each motor welding set is equipped with:

- a three-phase outlet, EEC 16A 230V 3P+GND
- a single-phase outlet, EEC 16A 230V 2P+GND
- 48V AC couplings

The available power is as indicated on the adhesive label carrying the technical characteristics (Fig.2).

**WARNING**

- *The sum of absorption of all the utilities connected to the motor welding set must never exceed the continuous power value of the motor welding set.*
- *During the first 50 hours of operation, do not draw more than 60% of maximum suppliable power and frequently check the oil level with the graduated dipstick (Fig.3, Ref.1). The oil level must always be between the MAX and MIN notches on the dipstick (Fig.8).*

4.6 Use as welder

The motor welding sets of the Multiwork **MW 170 HB-RE** may be used as direct current generators for arc welding. Before doing any welding, leave the engine to idle for at least five minutes so that it gradually reaches the operating temperature. This will guarantee longer life of the engine and eliminate the risk of seizures.

The welding cables must be connected to the special couplings (Fig.3, Ref.11) respecting the polarity indicated. Regulate the welding current with the regulating knob (Fig.3, Ref.3):

- turning clockwise, the current increases,
- turning anticlockwise, the current decreases.

The welding arc is regulated with the regulating knob (Fig.3, Ref.2):

- turning clockwise, the arc penetration increases,
- turning anticlockwise, the arc penetration decreases.

**INFORMATION**

Bear in mind that for use of the majority of basic, rutile and basic cellulose electrodes, the electrode holder clip is connected to the "+" outlet while for rutile acid and rutile cellulose electrodes the electrode holder clip is connected to the "-" outlet.

For the best results, refer to the instructions normally given on the electrode packaging.

**WARNING**

During the first 50 hours of operation, do not draw more than 60% of maximum suppliable power and frequently check the oil level with the graduated dipstick (Fig.2, Ref.13). The oil level must always be between the MAX and MIN notches on the dipstick (Fig.8).

4.7 Using the remote control (optional)

The welding current can be remote-controlled by using the special control (Fig.7, Ref. 6).

To do this the remote control plug (Fig.6, Ref.1) must be inserted in the special connector (Fig.3, Ref.4) located on the control panel . In this way the control device on the control panel of the generator are overridden and those of the remote control enabled. The welding current is regulated in the same way as described in the preceding paragraph, by means of the potentiometer (Fig.6, Ref. 2). The regulation of the arc of welding, is taken place always through the potentiometer (Fig.3, Ref. 2).

**INFORMATION**

The remote control comes with a 20 m cable. Should it be necessary to modify the length, "MASE" technical service must first be consulted.

4.8 Stopping

Before stopping the engine it is recommended to run it without load for a few minutes and with the accelerator at minimum, thus allowing the inside temperature of the engine and the alternator to gradually reduce.

5 PROTECTIONS AND WARNING SIGNALS

The generators are equipped with a series of protections which safeguard them against improper use and faults which may compromise integrity and are:

Low oil pressure protection

Intervenes switching off the unit when sump oil level gets down to the minimum. Its intervention is not signaled by warning lights, therefore, in case machine stops it is always necessary to check oil level to make sure that it is not the cause of generator's stopping. Add the necessary quantity of oil to start up the generator again.

Protection against short-circuit and overload

In case of short-circuit and overloaded, the motor welding sets are autoprotette, disconnect in case of short-circuit and limiting the tension of exit in case of overload arriving up to the disconnect. Eliminating the cause of the short-circuit or overloaded, he will restore initial condition. The motor welding sets are provisions of a general differential interrupter, that pour earth in case of dispersion of tide, it has the assignment to interrupt the disbursement of the tide to all the taking. (Fig.3, rif.7)

6 MAINTENANCE

6.1 Preamble



CAUTION

Any maintenance operation on the motor welding set must be carried out with the engine off and leaving it to cool down sufficiently, and must only be carried out by authorised and suitably trained personnel.

It is recommended to scrupulously follow the instructions in the manual provided by the engine Manufacturer with each motor welding set.

It is important to regularly inspect and carry out maintenance on the motor welding set. The frequency of maintenance should be decided on the basis of the number of hours of operation indicated in the table at point 6.6.

6.2 Ordinary engine maintenance

The periodic maintenance operations to be carried out on the engine are indicated in the table at point 6.6. For more detailed information consult the manual provided by the engine manufacturer with each motor welding set.



WARNING

Daily check the oil level with the graduated dipstick (Fig.2, Ref. 13)

The oil level must always be between the MAX and MIN notches on the dipstick (see FIG.8).

6.3 Engine oil change

The engine is provided with oil for petrol engines with viscosity **SAE 10W/30**.



INFORMATION

Always check correct viscosity of lubricating oil in relation to range of temperatures of the environment in which the generator works, as indicated in table of Fig. 7.

Top-up and fill through the hole indicated in Fig. 2, ref. 13. For replacement of engine oil, remove the tap located on the bottom part of the oil sump, (Fig. 2, rif. 14), and let it flow into a suitable container.

It is recommended to drain the oil when it is still sufficiently warm to flow easily.

Close the drain tap and add the necessary quantity of oil in the sump.

Oil sump capacity is **1.1 lt**.



WARNING

- **Do not disperse of exhausted oil in the environment as it is a polluting product.**
- **Deliver the exhausted engine oil to proper disposal collecting centers.**
- **The first engine oil change must be carried out after the first 20 working hours and, afterwards, at intervals of 50 working hours.**

6.4 Spark plug maintenance

Spark plug type:

NGK - BR6HS

DENSO - W20EPR-U

It is necessary to periodically remove the carbon residues, that, due to use, deposit on the spark plug, by using a small metal brush or specific detergent.

Adjust distance of spark plug electrodes setting a value of **0.7 - 0.8 mm**, (Fig. 9).

6.5 Air filter cleaning/replacement

For good operation and for a long life of the engine, it is important to periodically clean and replace the air filter. A non efficient filter could be the cause of loss of power of the engine and excessive exhaust smoke.

To clean or replace the air filter, follow the steps here below.

- Remove the filter holder cover, (Fig. 4, ref. 2), undoing the butterfly retaining nut (Fig. 4, ref. 3).
- Extract the filter complete with the two elements: the sponge element and the paper element.
- The sponge element is simply washed with a domestic detergent or with a low-flammable solvent.

- Leave to dry well and soak the clean element in engine oil, then wring it out to remove the excess oil, since too much oil in the element causes excessive smoke at the exhaust.
- The paper element is cleaned with a blast of dry air, from the inside to the outside, with a pressure not exceeding **2 bar**. Should it be very dirty or have holes, replace it.

**WARNING**

Clean the air filter every 50 hours of operation. Reduce the intervals if the generator operates in particularly dusty environments. On average replace the complete air filter every three cleaning operations.

**DANGER**

Never clean the air filter with petrol or highly inflammable solvents since this might cause fire or explosions.

6.6 Table of scheduled maintenance

OPERATION	HOURS
Check engine oil level in sump	8
Clean air filter	50
Replace sump oil (*)	100
Clean and adjust spark plug electrode	100
Check valve slack	300
Fuel tank and screen cleaning	300

(*) **For the first time, replace oil after 20 working hours.**

6.7 Troubleshooting

The generator switches off during the operating period.

- Check if there is fuel in the tank. *Fill up.*
- Check if the low oil level protection has been activated, check the level and if low, add the oil necessary to bring it up to the correct level. *There are no warning lights; a visual inspection must always be carried out.*

The engine runs irregularly.

- Check the position of the starter lever. *It must have been re-opened after starting.*
- Check the spark plug condition. *Carry out maintenance or replace it.*
- Check the air filter. *Clean its elements or, if necessary, replace them.*

There is high smoke emission from the exhaust.

- Check the air filter. *Clean its elements or, if necessary, replace them.*
- Check that the oil level does not exceed the **MAX** notch. *Bring it down to the correct level.*

The alternator voltage is too low.

- Check that the engine rpm is **3240** without applied loads. *Consult an authorised Service Centre.*
- Check the state of the air filter. *Clean or replace if necessary.*

The generator does not deliver power to the outlets but the voltmeter indicates that voltage is present.

- Check that the magnetothermal differential switch, or a magnetothermal switch, is in the **ON** position.

The generator does not deliver power to the outlets and the voltmeter does not indicate that voltage is present.

- Likely alternator fault. *Consult Service Centre.*

7 TRANSPORT AND HANDLING

The motor welding set are fitted with a lifting hook to be used for handling (Fig.3 Ref. M).

Hook the machine carefully and lift it slowly without sudden movements.

**DANGER**

- **Hooking the motor welding set at points different from that indicated may cause damage to the motor welding set or be dangerous to the operators.**
- **During lifting all personnel must keep a safe distance and the operators must wear protective helmets.**

For movement on the ground, the version with trolley can be moved on the wheels provided.

8 STORAGE

If the generator is not going to be used for a long period of time it is necessary to proceed as follows.

- Remove the spark plug and pour from **3 to 5 cm³** of engine oil in the spark plug hole on the head of the cylinder and make a couple of start-up attempts but without turning on the generator; this will make the engine turn a few times and let the oil expand and lubricate cylinder and piston thus preventing rust on cylinder and valve. After the above operation, put back spark plug in its housing.
- Empty the fuel tank
- Replace engine oil
- Clean air filter
- Externally clean the generator unit removing dust and impurities.
- Protect the generator unit with a nylon cover and stow away positioning it horizontally in a dry and ventilated environment.

I INFORMATION

Refer to the engine use and maintenance manual for more details.

9 SCRAPPING

At the end of its lifetime the motor welding set must be taken to official scrapyards.

I INFORMATION

Do not dispose of the motor welding set at household refuse disposal sites, as many of its parts are polluting.

10 WIRING DIAGRAM REFERENCES

See Fig.10

- 1 ALTERNATOR
- 2 HOUR COUNTER
- 3 POWER TERMINAL BOARD
- 4 OUTLET 2P+GND 16A
- 5 VOLTMETER
- 6 SET OF THREE CAPACITORS
- 7 EARTH CONNECTION SCREW
- 8 48V A.C. COUPLINGS
- 9 SCR DIODE BRIDGE
- 10 WELDING ADJUSTMENT CARD
- 11 WELDING ADJUSTMENT POTENTIOMETER
- 12 ARC ADJUSTMENT POTENTIOMETER
- 13 POTENTIOMETER CARD
- 14 REMOTE-CONTROL CONNECTOR
- 15 WELDING COUPLINGS (+/-)
- 16 SHUNT
- 17 IMPEDENCE
- 18 OUTLET 3P+T 16A
- 19 DIFFERENTIAL SWITCH 4P